

\* \* \* \* \* STN Columbus \* \* \* \* \*

FILE 'HOME' ENTERED AT 15:00:49 ON 04 JUN 2001

=> fil .bec

COST IN U.S. DOLLARS

SINCE FILE

TOTAL

ENTRY

SESSION

FULL ESTIMATED COST

1.05

1.05

FILE 'BIOTECHDS' ACCESS NOT AUTHORIZED

FILES 'MEDLINE, SCISEARCH, LIFESCI, BIOSIS, EMBASE, HCAPLUS, NTIS, ESBIODBASE,  
BIOTECHNO' ENTERED AT 15:04:46 ON 04 JUN 2001

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9 FILES IN THE FILE LIST

=> s carbon(2a) (flux or flow)

FILE 'MEDLINE'

171519 CARBON

18713 FLUX

269049 FLOW

L1 551 CARBON (2A) (FLUX OR FLOW)

FILE 'SCISEARCH'

245718 CARBON

94345 FLUX

422938 FLOW

L2 2073 CARBON (2A) (FLUX OR FLOW)

FILE 'LIFESCI'

37332 CARBON

8505 FLUX

38517 FLOW

L3 798 CARBON (2A) (FLUX OR FLOW)

FILE 'BIOSIS'

209917 CARBON

37753 FLUX

290132 FLOW

L4 2555 CARBON (2A) (FLUX OR FLOW)

FILE 'EMBASE'

114261 CARBON

22295 FLUX

281693 FLOW

L5 686 CARBON (2A) (FLUX OR FLOW)

FILE 'HCAPLUS'

813797 CARBON

189873 FLUX

601368 FLOW

L6 3966 CARBON (2A) (FLUX OR FLOW)

FILE 'NTIS'

67773 CARBON

35117 FLUX

158571 FLOW

L7 244 CARBON (2A) (FLUX OR FLOW)

FILE 'ESBIOBASE'

37759 CARBON

10549 FLUX

57729 FLOW

L8 691 CARBON(2A) (FLUX OR FLOW)

FILE 'BIOTECHNO'

28206 CARBON

5733 FLUX

39068 FLOW

L9 403 CARBON(2A) (FLUX OR FLOW)

TOTAL FOR ALL FILES

L10 11967 CARBON(2A) (FLUX OR FLOW)

=> s l11(6a)(modif? or alter? or increas?)

FILE 'MEDLINE'

L11 NOT FOUND

The L-number entered could not be found. To see the definition of L-numbers, enter DISPLAY HISTORY at an arrow prompt (=>).

=> s l10(6a)(modif? or alter? or increas?)

FILE 'MEDLINE'

266133 MODIF?

492766 ALTER?

1464541 INCREAS?

L11 65 L1 (6A) (MODIF? OR ALTER? OR INCREAS?)

FILE 'SCISEARCH'

348287 MODIF?

457622 ALTER?

1361552 INCREAS?

L12 134 L2 (6A) (MODIF? OR ALTER? OR INCREAS?)

FILE 'LIFESCI'

74001 MODIF?

135323 ALTER?

385560 INCREAS?

L13 73 L3 (6A) (MODIF? OR ALTER? OR INCREAS?)

FILE 'BIOSIS'

294942 MODIF?

902484 ALTER?

1664439 INCREAS?

L14 156 L4 (6A) (MODIF? OR ALTER? OR INCREAS?)

FILE 'EMBASE'

257055 MODIF?

480808 ALTER?

1445943 INCREAS?

L15 74 L5 (6A) (MODIF? OR ALTER? OR INCREAS?)

FILE 'HCAPLUS'

687933 MODIF?

629153 ALTER?

3019774 INCREAS?

L16 161 L6 (6A) (MODIF? OR ALTER? OR INCREAS?)

FILE 'NTIS'

92330 MODIF?  
84850 ALTER?  
169153 INCREAS?  
L17 9 L7 (6A) (MODIF? OR ALTER? OR INCREAS?)

FILE 'ESBIOBASE'

85190 MODIF?  
136673 ALTER?  
412907 INCREAS?  
L18 64 L8 (6A) (MODIF? OR ALTER? OR INCREAS?)

FILE 'BIOTECHNO'

66989 MODIF?  
116480 ALTER?  
301878 INCREAS?  
L19 47 L9 (6A) (MODIF? OR ALTER? OR INCREAS?)

TOTAL FOR ALL FILES

L20 783 L10 (6A) (MODIF? OR ALTER? OR INCREAS?) 24

=> s (phosphoenolpyruvate or (phospho enol or phosphoenol) (w)pyruvate or  
pep) (4a) (suppl#### or availab?)

FILE 'MEDLINE'

5737 PHOSPHOENOLPYRUVATE  
2769 PHOSPHO  
656 ENOL  
58 PHOSPHO ENOL  
(PHOSPHO(W) ENOL)  
212 PHOSPHOENOL  
21650 PYRUVATE  
2592 PEP  
293413 SUPPL####  
224871 AVAILAB?  
L21 32 (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE  
OR PEP) (4A) (SUPPL#### OR AVAILAB?)

FILE 'SCISEARCH'

5125 PHOSPHOENOLPYRUVATE  
2267 PHOSPHO  
6137 ENOL  
61 PHOSPHO ENOL  
(PHOSPHO(W) ENOL)  
198 PHOSPHOENOL  
16234 PYRUVATE  
2294 PEP  
86550 SUPPL####  
253392 AVAILAB?  
L22 38 (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE  
OR PEP) (4A) (SUPPL#### OR AVAILAB?)

FILE 'LIFESCI'

1901 PHOSPHOENOLPYRUVATE  
1043 "PHOSPHO"  
218 "ENOL"  
20 PHOSPHO ENOL  
("PHOSPHO" (W) "ENOL")  
106 PHOSPHOENOL  
5196 PYRUVATE  
777 PEP

18178 SUPPL####  
68484 AVAILAB?  
L23 19 (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE  
OR PEP) (4A) (SUPPL#### OR AVAILAB?)

FILE 'BIOSIS'

6991 PHOSPHOENOLPYRUVATE  
55595 PHOSPHO  
1886 ENOL  
151 PHOSPHO ENOL  
(PHOSPHO (W) ENOL)  
3610 PHOSPHOENOL  
32624 PYRUVATE  
3410 PEP  
88435 SUPPL####  
223224 AVAILAB?  
L24 38 (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE  
OR PEP) (4A) (SUPPL#### OR AVAILAB?)

FILE 'EMBASE'

3928 PHOSPHOENOLPYRUVATE  
2133 "PHOSPHO"  
1554 "ENOL"  
40 PHOSPHO ENOL  
( "PHOSPHO" (W) "ENOL" )  
164 PHOSPHOENOL  
17892 PYRUVATE  
2371 PEP  
65475 SUPPL####  
224916 AVAILAB?  
L25 30 (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE  
OR PEP) (4A) (SUPPL#### OR AVAILAB?)

FILE 'HCAPLUS'

9920 PHOSPHOENOLPYRUVATE  
6926 PHOSPHO  
17787 ENOL  
52 PHOSPHO ENOL  
(PHOSPHO (W) ENOL)  
551 PHOSPHOENOL  
43337 PYRUVATE  
5153 PEP  
182395 SUPPL####  
316742 AVAILAB?  
L26 60 (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE  
OR PEP) (4A) (SUPPL#### OR AVAILAB?)

FILE 'NTIS'

36 PHOSPHOENOLPYRUVATE  
48 PHOSPHO  
74 ENOL  
0 PHOSPHO ENOL  
(PHOSPHO (W) ENOL)  
5 PHOSPHOENOL  
299 PYRUVATE  
1164 PEP  
83018 SUPPL####  
233348 AVAILAB?  
L27 16 (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE

OR PEP) (4A) (SUPPL#### OR AVAILAB?)

FILE 'ESBIOBASE'

1402 PHOSPHOENOLPYRUVATE  
1062 PHOSPHO  
299 ENOL  
22 PHOSPHO ENOL  
(PHOSPHO(W) ENOL)  
55 PHOSPHOENOL  
4190 PYRUVATE  
684 PEP  
17201 SUPPL####  
62856 AVAILAB?  
L28 12 (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE  
OR PEP) (4A) (SUPPL#### OR AVAILAB?)

FILE 'BIOTECHNO'

2120 PHOSPHOENOLPYRUVATE  
1124 PHOSPHO  
152 ENOL  
17 PHOSPHO ENOL  
(PHOSPHO(W) ENOL)  
65 PHOSPHOENOL  
5526 PYRUVATE  
657 PEP  
10810 SUPPL####  
43572 AVAILAB?  
L29 15 (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE  
OR PEP) (4A) (SUPPL#### OR AVAILAB?)

TOTAL FOR ALL FILES

L30 260 (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVAT  
E OR PEP) (4A) (SUPPL#### OR AVAILAB?) 48

=> s phosphotransferase# or phospho transferase#

FILE 'MEDLINE'

17633 PHOSPHOTRANSFERASE#  
2769 PHOSPHO  
36615 TRANSFERASE#  
14 PHOSPHO TRANSFERASE#  
(PHOSPHO(W) TRANSFERASE#)  
L31 17641 PHOSPHOTRANSFERASE# OR PHOSPHO TRANSFERASE#

FILE 'SCISEARCH'

4037 PHOSPHOTRANSFERASE#  
2267 PHOSPHO  
30525 TRANSFERASE#  
13 PHOSPHO TRANSFERASE#  
(PHOSPHO(W) TRANSFERASE#)  
L32 4048 PHOSPHOTRANSFERASE# OR PHOSPHO TRANSFERASE#

FILE 'LIFESCI'

2504 PHOSPHOTRANSFERASE#  
1043 "PHOSPHO"  
10529 TRANSFERASE#  
7 PHOSPHO TRANSFERASE#  
("PHOSPHO" (W) TRANSFERASE#)  
L33 2508 PHOSPHOTRANSFERASE# OR PHOSPHO TRANSFERASE#

FILE 'BIOSIS'  
 5521 PHOSPHOTRANSFERASE#  
 55595 PHOSPHO  
 62006 TRANSFERASE#  
 1751 PHOSPHO TRANSFERASE#  
 (PHOSPHO (W) TRANSFERASE#)  
 L34 6624 PHOSPHOTRANSFERASE# OR PHOSPHO TRANSFERASE#

FILE 'EMBASE'  
 7822 PHOSPHOTRANSFERASE#  
 2133 "PHOSPHO"  
 28159 TRANSFERASE#  
 6 PHOSPHO TRANSFERASE#  
 ("PHOSPHO" (W) TRANSFERASE#)  
 L35 7827 PHOSPHOTRANSFERASE# OR PHOSPHO TRANSFERASE#

FILE 'HCAPLUS'  
 6754 PHOSPHOTRANSFERASE#  
 6926 PHOSPHO  
 36938 TRANSFERASE#  
 12 PHOSPHO TRANSFERASE#  
 (PHOSPHO (W) TRANSFERASE#)  
 L36 6763 PHOSPHOTRANSFERASE# OR PHOSPHO TRANSFERASE#

FILE 'NTIS'  
 126 PHOSPHOTRANSFERASE#  
 48 PHOSPHO  
 828 TRANSFERASE#  
 0 PHOSPHO TRANSFERASE#  
 (PHOSPHO (W) TRANSFERASE#)  
 L37 126 PHOSPHOTRANSFERASE# OR PHOSPHO TRANSFERASE#

FILE 'ESBIOBASE'  
 2733 PHOSPHOTRANSFERASE#  
 1062 PHOSPHO  
 21681 TRANSFERASE#  
 5 PHOSPHO TRANSFERASE#  
 (PHOSPHO (W) TRANSFERASE#)  
 L38 2736 PHOSPHOTRANSFERASE# OR PHOSPHO TRANSFERASE#

FILE 'BIOTECHNO'  
 5133 PHOSPHOTRANSFERASE#  
 1124 PHOSPHO  
 12894 TRANSFERASE#  
 4 PHOSPHO TRANSFERASE#  
 (PHOSPHO (W) TRANSFERASE#)  
 L39 5135 PHOSPHOTRANSFERASE# OR PHOSPHO TRANSFERASE#

TOTAL FOR ALL FILES  
 L40 53408 PHOSPHOTRANSFERASE# OR PHOSPHO TRANSFERASE# 60

=> s 140 and 110  
 FILE 'MEDLINE'  
 L41 15 L31 AND L1

FILE 'SCISEARCH'  
 L42 21 L32 AND L2

FILE 'LIFESCI'

L43 7 L33 AND L3

FILE 'BIOSIS'

L44 11 L34 AND L4

FILE 'EMBASE'

L45 8 L35 AND L5

FILE 'HCAPLUS'

L46 13 L36 AND L6

FILE 'NTIS'

L47 1 L37 AND L7

FILE 'ESBIOBASE'

L48 8 L38 AND L8

FILE 'BIOTECHNO'

L49 8 L39 AND L9

TOTAL FOR ALL FILES

L50 92 L40 AND L10 72

=> s l40(8a)(delet? or inactivat?)

FILE 'MEDLINE'

95846 DELET?

82661 INACTIVAT?

L51 106 L31(8A)(DELET? OR INACTIVAT?)

FILE 'SCISEARCH'

80518 DELET?

64898 INACTIVAT?

L52 49 L32(8A)(DELET? OR INACTIVAT?)

FILE 'LIFESCI'

44122 DELET?

31546 INACTIVAT?

L53 63 L33(8A)(DELET? OR INACTIVAT?)

FILE 'BIOSIS'

92102 DELET?

91024 INACTIVAT?

L54 111 L34(8A)(DELET? OR INACTIVAT?)

FILE 'EMBASE'

81290 DELET?

72634 INACTIVAT?

L55 74 L35(8A)(DELET? OR INACTIVAT?)

FILE 'HCAPLUS'

90060 DELET?

114553 INACTIVAT?

L56 143 L36(8A)(DELET? OR INACTIVAT?)

FILE 'NTIS'

4131 DELET?

1965 INACTIVAT?

L57 0 L37(8A)(DELET? OR INACTIVAT?)

FILE 'ESBIOBASE'  
39036 DELET?  
25310 INACTIVAT?  
L58 17 L38(8A) (DELET? OR INACTIVAT?)

FILE 'BIOTECHNO'  
58184 DELET?  
32463 INACTIVAT?  
L59 47 L39(8A) (DELET? OR INACTIVAT?)

TOTAL FOR ALL FILES  
L60 610 L40(8A) (DELET? OR INACTIVAT?) 84

=> s l60 and transport?

FILE 'MEDLINE'  
212221 TRANSPORT?  
L61 9 L51 AND TRANSPORT?

FILE 'SCISEARCH'  
312532 TRANSPORT?  
L62 1 L52 AND TRANSPORT?

FILE 'LIFESCI'  
57930 TRANSPORT?  
L63 2 L53 AND TRANSPORT?

FILE 'BIOSIS'  
930642 TRANSPORT?  
L64 11 L54 AND TRANSPORT?

FILE 'EMBASE'  
218793 TRANSPORT?  
L65 9 L55 AND TRANSPORT?

FILE 'HCAPLUS'  
544509 TRANSPORT?  
L66 16 L56 AND TRANSPORT?

FILE 'NTIS'  
129529 TRANSPORT?  
L67 0 L57 AND TRANSPORT?

FILE 'ESBIOBASE'  
127906 TRANSPORT?  
L68 1 L58 AND TRANSPORT?

FILE 'BIOTECHNO'  
63819 TRANSPORT?  
L69 3 L59 AND TRANSPORT?

TOTAL FOR ALL FILES  
L70 52 L60 AND TRANSPORT? 96

=> s l40 and glucose

FILE 'MEDLINE'  
218960 GLUCOSE  
L71 2227 L31 AND GLUCOSE

FILE 'SCISEARCH'



141907 GLUCOSE  
L72 740 L32 AND GLUCOSE

FILE 'LIFESCI'  
35148 GLUCOSE  
L73 458 L33 AND GLUCOSE

FILE 'BIOSIS'  
228090 GLUCOSE  
L74 1104 L34 AND GLUCOSE

FILE 'EMBASE'  
178908 GLUCOSE  
L75 905 L35 AND GLUCOSE

FILE 'HCAPLUS'  
304062 GLUCOSE  
L76 1289 L36 AND GLUCOSE

FILE 'NTIS'  
2794 GLUCOSE  
L77 9 L37 AND GLUCOSE

FILE 'ESBIOBASE'  
38663 GLUCOSE  
L78 382 L38 AND GLUCOSE

FILE 'BIOTECHNO'  
34995 GLUCOSE  
L79 563 L39 AND GLUCOSE

TOTAL FOR ALL FILES  
L80 7677 L40 AND GLUCOSE 158

=> s 160 and 180  
FILE 'MEDLINE'  
L81 16 L51 AND L71

FILE 'SCISEARCH'  
L82 4 L52 AND L72

FILE 'LIFESCI'  
L83 6 L53 AND L73

FILE 'BIOSIS'  
L84 16 L54 AND L74

FILE 'EMBASE'  
L85 14 L55 AND L75

FILE 'HCAPLUS'  
L86 20 L56 AND L76

FILE 'NTIS'  
L87 0 L57 AND L77

FILE 'ESBIOBASE'  
L88 3 L58 AND L78

FILE 'BIOTECHNO'  
L89 7 L59 AND L79

TOTAL FOR ALL FILES  
L90 86 L60 AND L80

=> s l80 and transport  
FILE 'MEDLINE'  
178166 TRANSPORT  
L91 608 L71 AND TRANSPORT

FILE 'SCISEARCH'  
275484 TRANSPORT  
L92 329 L72 AND TRANSPORT

FILE 'LIFESCI'  
46564 TRANSPORT  
L93 184 L73 AND TRANSPORT

FILE 'BIOSIS'  
899753 TRANSPORT  
L94 372 L74 AND TRANSPORT

FILE 'EMBASE'  
197806 TRANSPORT  
L95 401 L75 AND TRANSPORT

FILE 'HCAPLUS'  
489058 TRANSPORT  
L96 513 L76 AND TRANSPORT

FILE 'NTIS'  
75037 TRANSPORT  
L97 3 L77 AND TRANSPORT

FILE 'ESBIOBASE'  
118821 TRANSPORT  
L98 186 L78 AND TRANSPORT

FILE 'BIOTECHNO'  
56295 TRANSPORT  
L99 270 L79 AND TRANSPORT

TOTAL FOR ALL FILES  
L100 2866 L80 AND TRANSPORT

=> s l100 and (phosphoenolpyruvate or (phospho enol or phosphoenol) (w)pyruvate or pep)

FILE 'MEDLINE'  
5737 PHOSPHOENOLPYRUVATE  
2769 PHOSPHO  
656 ENOL  
58 PHOSPHO ENOL  
(PHOSPHO (W) ENOL)  
212 PHOSPHOENOL  
21650 PYRUVATE  
238 (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE  
2592 PEP  
L101 326 L91 AND (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W)

PYRUVATE OR PEP)

FILE 'SCISEARCH'

5125 PHOSPHOENOLPYRUVATE  
2267 PHOSPHO  
6137 ENOL  
61 PHOSPHO ENOL  
(PHOSPHO(W) ENOL)  
198 PHOSPHOENOL  
16234 PYRUVATE  
242 (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE  
2294 PEP  
L102 227 L92 AND (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W)  
PYRUVATE OR PEP)

FILE 'LIFESCI'

1901 PHOSPHOENOLPYRUVATE  
1043 "PHOSPHO"  
218 "ENOL"  
20 PHOSPHO ENOL  
( "PHOSPHO" (W) "ENOL" )  
106 PHOSPHOENOL  
5196 PYRUVATE  
116 (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE  
777 PEP  
L103 134 L93 AND (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W)  
PYRUVATE OR PEP)

FILE 'BIOSIS'

6991 PHOSPHOENOLPYRUVATE  
55595 PHOSPHO  
1886 ENOL  
151 PHOSPHO ENOL  
(PHOSPHO(W) ENOL)  
3610 PHOSPHOENOL  
32624 PYRUVATE  
3699 (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE  
3410 PEP  
L104 251 L94 AND (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W)  
PYRUVATE OR PEP)

FILE 'EMBASE'

3928 PHOSPHOENOLPYRUVATE  
2133 "PHOSPHO"  
1554 "ENOL"  
40 PHOSPHO ENOL  
( "PHOSPHO" (W) "ENOL" )  
164 PHOSPHOENOL  
17892 PYRUVATE  
187 (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE  
2371 PEP  
L105 251 L95 AND (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W)  
PYRUVATE OR PEP)

FILE 'HCAPLUS'

9920 PHOSPHOENOLPYRUVATE  
6926 PHOSPHO  
17787 ENOL  
52 PHOSPHO ENOL

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                (PHOSPHO(W) ENOL)
            551 PHOSPHOENOL
        43337 PYRUVATE
            526 (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE
            5153 PEP
L106      381 L96 AND (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W)
                PYRUVATE OR PEP)

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FILE 'NTIS'
            36 PHOSPHOENOLPYRUVATE
            48 PHOSPHO
            74 ENOL
            0 PHOSPHO ENOL
                (PHOSPHO(W) ENOL)
            5 PHOSPHOENOL
        299 PYRUVATE
            3 (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE
        1164 PEP
L107      3 L97 AND (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W)
                PYRUVATE OR PEP)

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FILE 'ESBIOBASE'
        1402 PHOSPHOENOLPYRUVATE
        1062 PHOSPHO
        299 ENOL
        22 PHOSPHO ENOL
            (PHOSPHO(W) ENOL)
        55 PHOSPHOENOL
        4190 PYRUVATE
            75 (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE
        684 PEP
L108      98 L98 AND (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W)
                PYRUVATE OR PEP)

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FILE 'BIOTECHNO'
        2120 PHOSPHOENOLPYRUVATE
        1124 PHOSPHO
        152 ENOL
        17 PHOSPHO ENOL
            (PHOSPHO(W) ENOL)
        65 PHOSPHOENOL
        5526 PYRUVATE
            76 (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE
        657 PEP
L109      171 L99 AND (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W)
                PYRUVATE OR PEP)

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TOTAL FOR ALL FILES
L110      1842 L100 AND (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W
                ) PYRUVATE OR PEP)

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=> s l110 and mut/q
FILE 'MEDLINE'
L111      205 L101 AND MUT/Q

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FILE 'SCISEARCH'
L112      134 L102 AND MUT/Q

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FILE 'LIFESCI'

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144

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L113          69 L103 AND MUT/Q

FILE 'BIOSIS'
L114          139 L104 AND MUT/Q

FILE 'EMBASE'
L115          139 L105 AND MUT/Q

FILE 'HCAPLUS'
L116          200 L106 AND MUT/Q

FILE 'NTIS'
L117          2 L107 AND MUT/Q

FILE 'ESBIOBASE'
L118          62 L108 AND MUT/Q

FILE 'BIOTECHNO'
L119          101 L109 AND MUT/Q

TOTAL FOR ALL FILES
L120          1051 L110 AND MUT/Q 156

=> s l120 and (aromatic or shikimate)
FILE 'MEDLINE'
      21820 AROMATIC
      302 SHIKIMATE
L121          2 L111 AND (AROMATIC OR SHIKIMATE)

FILE 'SCISEARCH'
      73889 AROMATIC
      689 SHIKIMATE
L122          3 L112 AND (AROMATIC OR SHIKIMATE)

FILE 'LIFESCI'
      11409 AROMATIC
      236 SHIKIMATE
L123          2 L113 AND (AROMATIC OR SHIKIMATE)

FILE 'BIOSIS'
      39555 AROMATIC
      1004 SHIKIMATE
L124          2 L114 AND (AROMATIC OR SHIKIMATE)

FILE 'EMBASE'
      35600 AROMATIC
      262 SHIKIMATE
L125          2 L115 AND (AROMATIC OR SHIKIMATE)

FILE 'HCAPLUS'
      173305 AROMATIC
      235312 AROM
      326665 AROMATIC
              (AROMATIC OR AROM)
      1518 SHIKIMATE
L126          5 L116 AND (AROMATIC OR SHIKIMATE)

FILE 'NTIS'
      11111 AROMATIC

```

L127 8 SHIKIMATE  
0 L117 AND (AROMATIC OR SHIKIMATE)

FILE 'ESBIOBASE'

10653 AROMATIC  
202 SHIKIMATE  
L128 1 L118 AND (AROMATIC OR SHIKIMATE)

FILE 'BIOTECHNO'

10059 AROMATIC  
179 SHIKIMATE  
L129 2 L119 AND (AROMATIC OR SHIKIMATE)

TOTAL FOR ALL FILES

L130 19 L120 AND (AROMATIC OR SHIKIMATE) 168

=> s 120 and (phosphoenolpyruvate or (phospho enol or phosphoenol) (w)pyruvate or pep)

FILE 'MEDLINE'

5737 PHOSPHOENOLPYRUVATE  
2769 PHOSPHO  
656 ENOL  
58 PHOSPHO ENOL  
(PHOSPHO(W) ENOL)  
212 PHOSPHOENOL  
21650 PYRUVATE  
238 (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE  
2592 PEP  
L131 6 L11 AND (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE OR PEP)

FILE 'SCISEARCH'

5125 PHOSPHOENOLPYRUVATE  
2267 PHOSPHO  
6137 ENOL  
61 PHOSPHO ENOL  
(PHOSPHO(W) ENOL)  
198 PHOSPHOENOL  
16234 PYRUVATE  
242 (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE  
2294 PEP  
L132 9 L12 AND (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE OR PEP)

FILE 'LIFESCI'

1901 PHOSPHOENOLPYRUVATE  
1043 "PHOSPHO"  
218 "ENOL"  
20 PHOSPHO ENOL  
("PHOSPHO" (W) "ENOL")  
106 PHOSPHOENOL  
5196 PYRUVATE  
116 (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE  
777 PEP  
L133 8 L13 AND (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE OR PEP)

FILE 'BIOSIS'

6991 PHOSPHOENOLPYRUVATE

55595 PHOSPHO  
 1886 ENOL  
 151 PHOSPHO ENOL  
     (PHOSPHO(W) ENOL)  
 3610 PHOSPHOENOL  
 32624 PYRUVATE  
 3699 (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE  
 3410 PEP  
 L134 15 L14 AND (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W)  
     PYRUVATE OR PEP)

FILE 'EMBASE'

3928 PHOSPHOENOLPYRUVATE  
 2133 "PHOSPHO"  
 1554 "ENOL"  
 40 PHOSPHO ENOL  
     ("PHOSPHO"(W) "ENOL")  
 164 PHOSPHOENOL  
 17892 PYRUVATE  
 187 (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE  
 2371 PEP  
 L135 6 L15 AND (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W)  
     PYRUVATE OR PEP)

FILE 'HCAPLUS'

9920 PHOSPHOENOLPYRUVATE  
 6926 PHOSPHO  
 17787 ENOL  
 52 PHOSPHO ENOL  
     (PHOSPHO(W) ENOL)  
 551 PHOSPHOENOL  
 43337 PYRUVATE  
 526 (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE  
 5153 PEP  
 L136 18 L16 AND (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W)  
     PYRUVATE OR PEP)

FILE 'NTIS'

36 PHOSPHOENOLPYRUVATE  
 48 PHOSPHO  
 74 ENOL  
 0 PHOSPHO ENOL  
     (PHOSPHO(W) ENOL)  
 5 PHOSPHOENOL  
 299 PYRUVATE  
 3 (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE  
 1164 PEP  
 L137 0 L17 AND (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W)  
     PYRUVATE OR PEP)

FILE 'ESBIOBASE'

1402 PHOSPHOENOLPYRUVATE  
 1062 PHOSPHO  
 299 ENOL  
 22 PHOSPHO ENOL  
     (PHOSPHO(W) ENOL)  
 55 PHOSPHOENOL  
 4190 PYRUVATE  
 75 (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE

684 PEP  
L138 6 L18 AND (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W)  
PYRUVATE OR PEP)

FILE 'BIOTECHNO'

2120 PHOSPHOENOLPYRUVATE  
1124 PHOSPHO  
152 ENOL  
17 PHOSPHO ENOL  
(PHOSPHO (W) ENOL)  
65 PHOSPHOENOL  
5526 PYRUVATE  
76 (PHOSPHO ENOL OR PHOSPHOENOL) (W) PYRUVATE  
657 PEP  
L139 6 L19 AND (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W)  
PYRUVATE OR PEP)

TOTAL FOR ALL FILES

L140 74 L20 AND (PHOSPHOENOLPYRUVATE OR (PHOSPHO ENOL OR PHOSPHOENOL) (W) 180  
PYRUVATE OR PEP)

=> s l20 and glucose

FILE 'MEDLINE'

218960 GLUCOSE  
L141 24 L11 AND GLUCOSE

FILE 'SCISEARCH'

141907 GLUCOSE  
L142 26 L12 AND GLUCOSE

FILE 'LIFESCI'

35148 GLUCOSE  
L143 15 L13 AND GLUCOSE

FILE 'BIOSIS'

228090 GLUCOSE  
L144 33 L14 AND GLUCOSE

FILE 'EMBASE'

178908 GLUCOSE  
L145 30 L15 AND GLUCOSE

FILE 'HCAPLUS'

304062 GLUCOSE  
L146 33 L16 AND GLUCOSE

FILE 'NTIS'

2794 GLUCOSE  
L147 0 L17 AND GLUCOSE

FILE 'ESBIOBASE'

38663 GLUCOSE  
L148 16 L18 AND GLUCOSE

FILE 'BIOTECHNO'

34995 GLUCOSE  
L149 21 L19 AND GLUCOSE

TOTAL FOR ALL FILES

142



L150 198 L20 AND GLUCOSE

=> s (130 or 150 or 170 or 190 or 1120 or 1130 or 1140 or 1150) and py=<1995  
range=2000,  
FILE 'MEDLINE'

2803 PY=<1995  
L151 0 (L21 OR L41 OR L61 OR L81 OR L111 OR L121 OR L131 OR L141) AND  
PY=<1995

FILE 'SCISEARCH'

0 PY=<1995  
L152 0 (L22 OR L42 OR L62 OR L82 OR L112 OR L122 OR L132 OR L142) AND  
PY=<1995

FILE 'LIFESCI'

191 PY=<1995  
L153 0 (L23 OR L43 OR L63 OR L83 OR L113 OR L123 OR L133 OR L143) AND  
PY=<1995

FILE 'BIOSIS'

35 PY=<1995  
L154 0 (L24 OR L44 OR L64 OR L84 OR L114 OR L124 OR L134 OR L144) AND  
PY=<1995

FILE 'EMBASE'

0 PY=<1995  
L155 0 (L25 OR L45 OR L65 OR L85 OR L115 OR L125 OR L135 OR L145) AND  
PY=<1995

FILE 'HCAPLUS'

3266 PY=<1995  
L156 0 (L26 OR L46 OR L66 OR L86 OR L116 OR L126 OR L136 OR L146) AND  
PY=<1995

FILE 'NTIS'

8472 PY=<1995  
L157 0 (L27 OR L47 OR L67 OR L87 OR L117 OR L127 OR L137 OR L147) AND  
PY=<1995

FILE 'ESBIOBASE'

0 PY=<1995  
L158 0 (L28 OR L48 OR L68 OR L88 OR L118 OR L128 OR L138 OR L148) AND  
PY=<1995

FILE 'BIOTECHNO'

845083 PY=<1995  
L159 75 (L29 OR L49 OR L69 OR L89 OR L119 OR L129 OR L139 OR L149) AND  
PY=<1995

TOTAL FOR ALL FILES

L160 75 (L30 OR L50 OR L70 OR L90 OR L120 OR L130 OR L140 OR L150) AND  
PY=<1995

=> log y

COST IN U.S. DOLLARS

SINCE FILE

TOTAL

ENTRY

SESSION

FULL ESTIMATED COST

23.20

24.25

STN INTERNATIONAL LOGOFF AT 15:19:00 ON 04 JUN 2001

	L #	Hits	Search Text	DBs	Time Stamp
1	L1	3000	carbon near2 (flux or flow)	USPAT; US-PGPUB	2001/06/04 15:26
2	L2	150	1 near4 (modif\$8 or alter\$8 or increas\$8)	USPAT; US-PGPUB	2001/06/04 15:27
3	L3	104	(phosphoenol adj pyruvate or pep or phosphoenolpyruvate or phospho adj enol adj pyruvate) near4 (suppl\$4 or availab\$8)	USPAT; US-PGPUB	2001/06/04 15:28
4	L4	2	2 and 3	USPAT; US-PGPUB	2001/06/04 15:29
5	L5	2505	phosphotransferase\$1 or phospho adj transferase\$1	USPAT; US-PGPUB	2001/06/04 15:28
6	L6	8	(2 or 3) and 5	USPAT; US-PGPUB	2001/06/04 15:29
7	L7	19	(2 or 3) same (aromatic or shikimate)	USPAT; US-PGPUB	2001/06/04 15:31

	L #	Hits	Search Text	DBs	Time Stamp
1	L1	3000	carbon near2 (flux or flow)	USPAT; US-PGPUB	2001/06/04 15:26
2	L2	150	1 near4 (modif\$8 or alter\$8 or increas\$8)	USPAT; US-PGPUB	2001/06/04 15:27
3	L3	104	(phosphoenol adj pyruvate or pep or phosphoenolpyruvate or phospho adj enol adj pyruvate) near4 (suppl\$4 or availab\$8)	USPAT; US-PGPUB	2001/06/04 15:28
4	L4	2	2 and 3	USPAT; US-PGPUB	2001/06/04 15:29
5	L5	2505	phosphotransferase\$1 or phospho adj transferase\$1	USPAT; US-PGPUB	2001/06/04 15:28
6	L6	8	(2 or 3) and 5	USPAT; US-PGPUB	2001/06/04 15:29

US-CL-CURRENT: 435/252.3,435/419 ,435/485 ,435/486 ,435/487 ,435/488 ,435/69.1 ,536/23.1 ,536/23.2 ,536/23.6

US-PAT-NO: 6204063

DOCUMENT-IDENTIFIER: US 6204063 B1

TITLE: Plant glycolysis and respiration enzymes

DATE-ISSUED: March 20, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Allen; Stephen M.	Wilmington	DE	N/A	N/A
Lee; Jian-Ming	Wilmington	DE	N/A	N/A
Lightner; Jonathan E.	Airville	PA	N/A	N/A
Odell; Joan T.	Unionville	PA	N/A	N/A

US-CL-CURRENT: 435/468,435/252.3 ,435/419 ,435/485 ,435/486 ,435/487 ,435/488 ,435/69.1 ,536/23.1 ,536/23.2 ,536/23.6

ABSTRACT:

This invention relates to an isolated nucleic acid fragment encoding a glycolysis or respiration protein. The invention also relates to the construction of a chimeric gene encoding all or a portion of the glycolysis or respiration protein, in sense or antisense orientation, wherein expression of the chimeric gene results in production of altered levels of the glycolysis or respiration protein in a transformed host cell.

9 Claims, 1 Drawing figures

Exemplary Claim Number: 1,5,7,9

Number of Drawing Sheets: 1

DRPR:

The nucleic acid fragments of the instant invention may be used to create transgenic plants in which the disclosed BCS1 or 6-phosphofructo 2-kinase/fructose 2,6-bisphosphatase proteins are present at higher or lower levels than normal or in cell types or developmental stages in which they are not normally found. This would have the effect of modulating respiration or altering the level of carbon flux in glycolysis in those cells.

DEPR:

A selectable marker gene which can be used to facilitate soybean transformation is a chimeric gene composed of the 35S promoter from Cauliflower Mosaic Virus (Odell et al.(1985) Nature 313:810-812), the hygromycin phosphotransferase gene from plasmid pJR225 (from E. coli; Gritz et al.(1983) Gene 25:179-188) and the 3' region of the nopaline synthase gene from the T-DNA of the Ti plasmid of Agrobacterium tumefaciens. The seed expression cassette comprising the phaseolin 5' region, the fragment encoding the glycolysis or respiration protein and the phaseolin 3' region can be isolated as a restriction fragment. This fragment can then be inserted into a unique restriction site of the vector carrying the marker gene.

US-CL-CURRENT: 435/232,530/350 ,536/23.1 ,536/23.2 ,536/23.7

US-PAT-NO: 6136576

DOCUMENT-IDENTIFIER: US 6136576 A

TITLE: Method for the recombinant production of 1,3-propanediol

DATE-ISSUED: October 24, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Diaz-Torres; Maria	San Mateo	CA	N/A	N/A
Dunn-Coleman; Nigel S	Los Gatos	CA	N/A	N/A
Chase; Matthew W.	Belmont	CA	N/A	N/A
Trimbur; Donald	Redwood City	CA	N/A	N/A

US-CL-CURRENT: 435/158,435/232 ,530/350 ,536/23.1 ,536/23.2 ,536/23.7

ABSTRACT:

The present invention provides an improved method for the production of 1,3-propanediol from a variety of carbon sources in an organism capable of 1,3-propanediol production and comprising DNA encoding protein X of a microorganismal dehydratase or protein X in combination with at least one of protein 1, protein 2 and protein 3, which proteins are comparable to those encoded by orfY, orfX and orfW, respectively from a microorganismal dha regulon. The protein X may be isolated from a diol dehydratase or a glycerol dehydratase. The present invention also provides host cells comprising protein X that are capable of increased production of 1,3-propanediol.

17 Claims, 27 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 27

DEPR:

E. coli strain ECL707 was transformed with cosmid K. pneumoniae DNA corresponding to one of pKP1, pKP2, pKP4 or the Supercos vector alone and named ECL707-pKP1, ECL707-pKP2, ECL707-pKP4, and ECL707-sc, respectively. ECL707 is defective in gipK, gld, and ptsD which encode the ATP-dependent glycerol kinase, NAD.sup.+ -linked glycerol dehydrogenase, and enzyme II for dihydroxyacetone of the phosphoenolpyruvate-dependent phosphotransferase system, respectively.

DEPL:

Mutations and transformations that affect carbon channeling. A variety of mutant organisms comprising variations in the 1,3-propanediol production pathway will be useful in the present invention. The introduction of a triosephosphate isomerase mutation (tpi-) into the microorganism is an example of the use of a mutation to improve the performance by carbon channeling. Alternatively, mutations which diminish the production of ethanol (adh) or lactate (ldh) will increase the availability of NADH for the production of 1,3-propanediol. Additional mutations in steps of glycolysis after glyceraldehyde-3-phosphate such as phosphoglycerate mutase (pgm) would be useful to increase the flow of carbon to the 1,3-propanediol production pathway. Mutations that effect glucose transport such as PTS which would prevent loss of PEP may also prove useful. Mutations which block alternate pathways for intermediates of the 1,3-propanediol production pathway such as the glycerol catabolic pathway (glp) would also be useful to the present invention. The mutation can be directed toward a structural gene so as to impair or improve the activity of an enzymatic activity or can be directed toward a regulatory gene so as to modulate the expression level of an enzymatic activity.

	L #	Hits	Search Text	DBs	Time Stamp
1	L1	3000	carbon near2 (flux or flow)	USPAT; US-PGPUB	2001/06/04 15:26
2	L2	150	1 near4 (modif\$8 or alter\$8 or increas\$8)	USPAT; US-PGPUB	2001/06/04 15:27
3	L3	104	(phosphoenol adj pyruvate or pep or phosphoenolpyruvate or phospho adj enol adj pyruvate) near4 (suppl\$4 or availab\$8)	USPAT; US-PGPUB	2001/06/04 15:28
4	L4	2	2 and 3	USPAT; US-PGPUB	2001/06/04 15:29
5	L5	2505	phosphotransferase\$1 or phospho adj transferase\$1	USPAT; US-PGPUB	2001/06/04 15:28
6	L6	8	(2 or 3) and 5	USPAT; US-PGPUB	2001/06/04 15:29
7	L7	19	(2 or 3) same (aromatic or shikimate)	USPAT; US-PGPUB	2001/06/04 15:31

US-CL-CURRENT: 530/300,536/23.1

US-PAT-NO: 6228638

DOCUMENT-IDENTIFIER: US 6228638 B1

TITLE: Escherichia coli CSRB gene and RNA encoded thereby

DATE-ISSUED: May 8, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Romeo; Tony	Burlington	TX	N/A	N/A

US-CL-CURRENT: 435/320.1,530/300 ,536/23.1

ABSTRACT:

The invention includes the gene *csrB*, the RNA encoded thereby and methods of use thereof. *csrB* RNA binds to and antagonizes the ability of CsrA to down-regulate the production of certain metabolic products. This invention is also drawn to methods of using *csrB* polynucleotides, and combination of *csrB* polynucleotides and CsrA polypeptides and antibodies that bind to such combinations.

6 Claims, 9 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 9

BSPR:

Further "metabolic engineering" can lead to even greater yields of desired amino acids or other products. In addition to being an amino acid precursor, PEP is a precursor of glucose via gluconeogenesis. Glucose is, in turn, a precursor of glycogen. Gluconeogenesis and glycogen synthesis are elevated in *csrA* mutants and would compete for the synthesis of aromatic amino acids. Therefore, in order to further increase carbon flow into the desired products (e.g., amino acids), engineering of gluconeogenesis, glycogen biosynthesis and possibly other pathways is desirable. A mutation in *jbp*, which encodes fructose-1,6-bisphosphatase, prevents gluconeogenesis from proceeding beyond the synthesis of fructose-1,6-bisphosphate. A mutation in *glgC* (ADP-glucose pyrophosphorylase) or *glgA* (glycogen synthase) further blocks residual glucose or glucose derivatives obtained from the media or generated within the cell from being used for glycogen synthesis. Each of these mutations is already known and can be introduced into a cell by methods known in the art. Further enhancement of the synthesis of a single aromatic amino acid can be achieved by introducing mutations which block the synthesis of other amino acids.

US-CL-CURRENT: 435/232,435/252.3 ,435/320.1

US-PAT-NO: 6210937

DOCUMENT-IDENTIFIER: US 6210937 B1

TITLE: Development of genetically engineered bacteria for production of selected aromatic compounds

DATE-ISSUED: April 3, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Ward; Thomas E.	Idaho Falls	ID	N/A	N/A
Watkins; Carolyn S.	Idaho Falls	ID	N/A	N/A
Bulmer; Deborah K.	Henderson	NV	N/A	N/A
Johnson; Bruce F.	Scotia	NY	N/A	N/A
Amaratunga; Mohan	Clifton Park	NY	N/A	N/A

US-CL-CURRENT: 435/146,435/232 ,435/252.3 ,435/320.1

ABSTRACT:

The cloning and expression of genes in the common aromatic pathway of *E. coli* are described. A compound for which chorismate, the final product of the common aromatic pathway, is an anabolic intermediate can be produced by cloning and expressing selected genes of the common aromatic pathway and the genes coding for enzymes necessary to convert chorismate to the selected compound. Plasmids carrying selected genes of the common aromatic pathway are also described.

14 Claims, 1 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 1

BSPR:

Efficient and cost-effective biosynthetic production of chorismate and its biosynthetic derivatives require that carbon sources such as glucose, lactose, galactose, and other sugars be converted to the selected product in high percentage yields. Accordingly, it is valuable from the standpoint of industrial biosynthetic production of aromatic compounds or other biosynthetic derivatives of chorismate to increase the flux of carbon sources into and through the common aromatic pathway, thereby enhancing biosynthesis of chorismate and its derivatives.

DEPR:

In preferred embodiments, the present invention is a method for increasing carbon flow into the common aromatic pathway of a host cell and thence to the selected aromatic compound. Increasing carbon flow requires the step of transforming the host cell with recombinant DNA containing selected genes such that the respective gene products are expressed at enhanced levels relative to wild type cells.

ORPL:

G. Gosset et al., "A Direct Comparison of Approches For Increasing Carbon Flow to Aromatic Biosynthesis in *Escherichia coli*" *J. Indust. Microbiol.* 17(1):47-52, Jul. 1996.



US-CL-CURRENT: 435/195,435/252.3 ,435/252.33 ,435/320.1 ,435/41 ,435/440  
435/455 ,435/69.1 ,536/23.1 ,536/23.2 ,536/23.7

US-PAT-NO: 6190892

DOCUMENT-IDENTIFIER: US 6190892 B1

TITLE: Microbial production of indigo

DATE-ISSUED: February 20, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Weyler; Walter	San Francisco	CA	N/A	N/A
Dodge; Timothy C.	Rochester	NY	N/A	N/A
Lauff; John J.	Rochester	NY	N/A	N/A
Wendt; Dan J.	San Mateo	CA	N/A	N/A

US-CL-CURRENT: 435/170,435/195 ,435/252.3 ,435/252.33 ,435/320.1 ,435/41  
435/440 ,435/455 ,435/69.1 ,536/23.1 ,536/23.2 ,536/23.7

ABSTRACT:

There is provided an improved process for the biosynthetic production of indigo, the improvement comprising removing unwanted by-products such as isatin or indirubin from the broth in which such indigo is produced. Isatin can be removed by enzymatic activity using an isatin-removing enzyme such as an isatin hydrolase, or by other techniques such as process parameters (elevated temperature, pH), or by contacting the broth containing the isatin with appropriate adsorption compounds/compositions such as carbon or appropriate resins. Since isatin is the precursor of indirubin, the indirubin levels are decreased as a result of isatin removal.

20 Claims, 11 Drawing figures

Exemplary Claim Number: 6

Number of Drawing Sheets: 13

BSPR:

Tryptophan pathway genes useful in securing biosynthetic indole accumulation include a trp operon, isolated from a microorganism as a purified DNA molecule that encodes an enzymatic pathway capable of directing the biosynthesis of L-tryptophan from chorismic acid. (A. J. Pittard (1987) Biosynthesis of Aromatic Amino Acids in Escherichia coli and Salmonella typhimurium, F. C. Neidhardt, ed., American Society for Microbiology, publisher, pp. 368-394.) Indole accumulation is enabled by modification of one or more of the pathway's structural elements and/or regulatory regions. This modified trp operon may then be introduced into a suitable host such as a microorganism, plant tissue culture system or other suitable expression system. It should be noted that the term "indole accumulation" does not necessarily indicate that indole actually accumulates intracellularly. Instead, this term can indicate that there is an increased flux of carbon to indole and indole is made available as a substrate for intracellular catalytic reactions such as indoxyl formation and other than the formation of L-tryptophan. In the context of this invention, the "accumulated" indole may be consumed in the conversion of indole to indoxyl by an oxygenase such as the aromatic dioxygenase NDO, or an aromatic monooxygenase such as TMO, or it may actually build up intracellularly and extracellularly, as would be the case when the desired end product is indole or one of its derivatives.